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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,098	12/30/2003	Byung Chul Cho	YPL-0070	6908

23413 7590 02/06/2006

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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 02/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/748,098	CHO ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The Affidavit filed on November 18, 2005 under 37 CFR 1.131 is sufficient to overcome the WO 03/009352 A1 reference.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 20040191413 A1)[1] in view of Murakami; Takeshi et al. (US 5,728,223 A). Park teaches:

i. A reaction chamber (100; Figure 3) for depositing a thin film (page 8, lines 11-19), the reaction chamber (100; Figure 3) comprising: a reactor block (110; Figure 3; page 8, lines 11-19); a wafer block (120; Figure 3; page 8, lines 11-19) located inside the reactor block

(110; Figure 3; page 8, lines 11-19); a top plate (130; Figure 3; page 8, lines 20-26) which covers the reactor block (110; Figure 3; page 8, lines 11-19) to maintain a predetermined pressure; a feeding unit (piece above immediately 130, 122, 122a, 121, 121a; not labeled Figure 3) which supplies a first reactive gas (122; Figure 3; page 8, lines 20-26) and a second reactive gas (121; Figure 3; page 8, lines 20-26); a shower head (140; Figure 3,12; page 8, lines 20-26), which is installed in the top plate (130; Figure 3; page 8, lines 20-26) and includes a plurality of first spray holes (141c; Figure 12; page 11, lines 13-25) for spraying the first reactive gas (122; Figure 3; page 8, lines 20-26) supplied from the feeding unit (piece above immediately 130, 122, 122a, 121, 121a; not labeled Figure 3) on a wafer and a plurality of second spray holes (142c; Figure 12; page 11, lines 13-25) for spraying the second reactive gas (121; Figure 3; page 8, lines 20-26) supplied from the feeding unit (piece above immediately 130, 122, 122a, 121, 121a; not labeled Figure 3); the feeding unit (piece above immediately 130, 122, 122a, 121, 121a; not labeled Figure 3) comprising: a feeding block (piece above immediately 130; not labeled Figure 3) that is connected to the shower head (140; Figure 3,12; page 8, lines 20-26); a distributing block (122; Figure 3) which is connected to a first gas (line upstream of 122; Figure 3; page 8, lines 20-26) supply line to uniformly distribute the first reactive gas (122; Figure 3; page 8, lines 20-26); two or more first gas (line upstream of 122; Figure 3; page 8, lines 20-26) transfer pipes (122a; Figure 3; page 8, lines 20-26) which connect the feeding block (piece above immediately 130; not labeled Figure 3) to the distributing block (122; Figure 3); and a second gas (121; Figure 3; page 8, lines 20-26)

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[1] 102(e)(1) date is INID 22 of WO 03/009352 A1 – 16 July 2002. See MPEP 706.02(a).

transfer pipe (121a; Figure 3; page 8, lines 20-26) which is formed in the center of the feeding block (piece above immediately 130; not labeled Figure 3) and connected to the second gas (121; Figure 3; page 8, lines 20-26) supply line (piping upstream of 121), the shower head (140; Figure 3,12; page 8, lines 20-26) comprising an upper diffusion block (140; Figure 3,12; page 8, lines 20-26) connected to the bottom of the feeding unit (piece above immediately 130, 122, 122a, 121, 121a; not labeled Figure 3) – claim 1

ii. Park's upper diffusion block (140; Figure 3,12; page 8, lines 20-26) comprising: a upper difussion block (outer ring part containing 142; Figure 3,12; page 8, lines 20-26) which is connected to Park's feeding block (piece above immediately 130; not labeled Figure 3) and includes first feeding holes (142; Figure 3,12; page 8, lines 20-26) which are respectively connected to Park's first gas (line upstream of 122; Figure 3; page 8, lines 20-26) transfer pipes (122a; Figure 3; page 8, lines 20-26) and a second feeding hole (141; Figure 3,12; page 8, lines 20-26) which is connected to Park's second gas (121; Figure 3; page 8, lines 20-26) transfer pipe (121a; Figure 3; page 8, lines 20-26); a plurality of first main flow paths (142a; Figure 12; page 8, lines 20-26) which are formed on Park's bottom of Park's upper difussion block (outer ring part containing 142; Figure 3,12; page 8, lines 20-26), which are connected to Park's first feeding holes (142; Figure 3,12; page 8, lines 20-26), respectively, and are radially and symmetrically formed around Park's center of Park's upper difussion block (outer ring part containing 142; Figure 3,12; page 8, lines 20-26); and a plurality of first sub-flow paths (142b; Figure 12; page 8, lines 20-26), which are formed in Park's bottom of Park's upper difussion block (outer ring part containing 142; Figure 3,12; page 8, lines 20-26) and extend

perpendicularly from each of Park's first main flow paths (142a; Figure 12; page 8, lines 20-26) – claim 1

iii. Park's reaction chamber (100; Figure 3) of claim 1, wherein Park's first gas (line upstream of 122; Figure 3; page 8, lines 20-26) transfer pipes (122a; Figure 3; page 8, lines 20-26) are symmetrically disposed between Park's feeding block (piece above immediately 130; not labeled Figure 3) and Park's distributing block (122; Figure 3), as claimed by claim 2

iv. Park's reaction chamber (100; Figure 3) of claim 1, wherein Park's upper diffusion block, Park's intermediate diffusion block, and Park's lower diffusion block (37, Figures 6, 8D; column 6, lines 38-65) are integrally formed (140; Figure 3,12; page 8, lines 20-26), as claimed by claim 7

Park does not teach:

i. an intermediate diffusion block adhered to Park's bottom of Park's upper diffusion block (140; Figure 3,12; page 8, lines 20-26), and a lower diffusion block (37, Figures 6, 8D; column 6, lines 38-65) adhered to the bottom of the intermediate diffusion block, the intermediate diffusion block comprising: a plurality of second main flow paths, which are formed on the intermediate diffusion block and respectively correspond to Park's first main flow paths (142a; Figure 12; page 8, lines 20-26); a plurality of second sub-flow paths which are formed on the intermediate diffusion block and respectively correspond to Park's first sub-flow paths (142b; Figure 12; page 8, lines 20-26); a plurality of first distributing holes which are formed at regular intervals in the second sub-flow paths and second main flow paths; and a second distributing hole connected to Park's second

feeding hole (141; Figure 3,12; page 8, lines 20-26), a lower diffusion block (37, Figures 6, 8D; column 6, lines 38-65) comprising: a plurality of first spray holes connected to the first distributing holes, respectively, for spraying Park's first reactive gas (122; Figure 3; page 8, lines 20-26) on Park's wafer; and a plurality of second spray holes formed between Park's first spray holes for spraying Park's second reactive gas (121; Figure 3; page 8, lines 20-26) on Park's wafer – claim 1

ii. Park's reaction chamber of claim 1, wherein a diffusion region having a plurality of convex portions and a plurality of concave portions is formed on the top surface of the lower diffusion block, and the first spray holes are formed in the convex portions and thr second spray holes are formed in the concave portions, as claimed by claim 3

iii. Park's reaction chamber (100; Figure 3) of claim 1, wherein each of the first sub-flow paths of Park's upper diffusion block (140; Figure 3,12; page 8, lines 20-26) has the same shape as each of the second sub-flow paths of the intermediate diffusion block, and each of the first main flow paths of Park's upper diffusion block (140; Figure 3,12; page 8, lines 20-26) has the same shape as each of the second main flow paths of the intermediate diffusion block, as claimed by claim 5

iv. Park's reaction chamber (100; Figure 3) of claim 1, wherein the number of Murakami's first feeding holes (142; Figure 3,12; page 8, lines 20-26) is proportional to each of the number of the first main flow paths and the number of the second main flow paths, as claimed by claim 6

Murakami teaches a wafer processing apparatus (Figure 1) and process gas distribution plates (31-33 Figures 6, 8a-c; column 6; lines 38-65) including:

i. an intermediate diffusion block (32, Figures 6, 8B; column 6, lines 38-65) adhered to Murakami's bottom of Murakami's upper diffusion block (31, Figures 6, 8A; column 6, lines 38-65), and a lower diffusion block (37, Figures 6, 8D; column 6, lines 38-65) adhered to the bottom of the intermediate diffusion block (32, Figures 6, 8B; column 6, lines 38-65), the intermediate diffusion block (32, Figures 6, 8B; column 6, lines 38-65) comprising: a plurality of second main flow paths (main branch on 32, Figures 6, 8C; column 6, lines 38-65), which are formed on the intermediate diffusion block (32, Figures 6, 8B; column 6, lines 38-65) and respectively correspond to Murakami's first main flow paths (main branch on 31, Figures 6, 8A; column 6, lines 38-65); a plurality of second sub-flow paths (perpedicular branch to main branch on 32, Figures 6, 8A; column 6, lines 38-65) which are formed on the intermediate diffusion block (32, Figures 6, 8B; column 6, lines 38-65) and respectively correspond to Murakami's first sub-flow paths (perpedicular branch to main branch on 31, Figures 6, 8A; column 6, lines 38-65); a plurality of first distributing holes (holes in 33, Figures 6, 8C; column 6, lines 38-65) which are formed at regular intervals in the second sub-flow paths (perpedicular branch to main branch on 32, Figures 6, 8A; column 6, lines 38-65) and second main flow paths (main branch on 32, Figures 6, 8C; column 6, lines 38-65); and a second distributing hole (24a, Figures 8A; column 6, lines 38-65) connected to Murakami's second feeding hole (24b, Figures 8B; column 6, lines 38-65), a lower diffusion block (37, Figures 6, 8D; column 6, lines 38-65) comprising: a plurality of first spray holes (42, Figure 6; column 6, lines 38-65) connected to the first distributing holes (holes in 33, Figures 6, 8C; column 6, lines 38-65), respectively, for spraying Murakami's first reactive gas on

Murakami's wafer; and a plurality of second spray holes (43,44, Figure 6; column 6, lines 38-65) formed between Murakami's first spray holes (42, Figure 6; column 6, lines 38-65) for spraying Murakami's second reactive gas on Murakami's wafer – claim 1

ii. Murakami's reaction chamber (100; Figure 3) of claim 1, wherein a diffusion region (37; Figure 6) having a plurality of convex portions (pieces between 44; Figure 6) and a plurality of concave portions (44; Figure 6) is formed on Murakami's top surface of Murakami's lower diffusion block (37, Figures 6, 8D; column 6, lines 38-65), and Murakami's first spray holes (42, Figure 6; column 6, lines 38-65) are formed in Murakami's convex portions (pieces between 44; Figure 6) and Murakami's second spray holes (43,44, Figure 6; column 6, lines 38-65) are formed in Murakami's concave portions (44; Figure 6), as claimed by claim 3

iii. Murakami's reaction chamber (100; Figure 3) of claim 1, wherein each of Murakami's first sub-flow paths (perpedicular branch to main branch on 31, Figures 6, 8A; column 6, lines 38-65) of Murakami's upper diffusion block (31, Figures 6, 8A; column 6, lines 38-65) has Murakami's same shape as each of the second sub-flow paths (perpedicular branch to main branch on 32, Figures 6, 8A; column 6, lines 38-65) of Murakami's intermediate diffusion block (32, Figures 6, 8B; column 6, lines 38-65), and each of Murakami's first main flow paths (main branch on 31, Figures 6, 8A; column 6, lines 38-65) of Murakami's upper diffusion block (31, Figures 6, 8A; column 6, lines 38-65) has Murakami's same shape as each of the second main flow paths (main branch on 32, Figures 6, 8C; column 6, lines 38-65) of the intermediate diffusion block (32, Figures 6, 8B; column 6, lines 38-65), as claimed by claim 5

iv. Murakami's reaction chamber (100; Figure 3) of claim 1, wherein Murakami's number of Murakami's first feeding holes (35; Figure 6) is proportional to each of Murakami's number of Murakami's first main flow paths (main branch on 31, Figures 6, 8A; column 6, lines 38-65) and Murakami's number of Murakami's second main flow paths (main branch on 32, Figures 6, 8C; column 6, lines 38-65), as claimed by claim 6

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Park's gas distribution components (Figure 6) with Murakami's gas distribution components (Figure 6).

Motivation to replace Park's gas distribution components (Figure 6) with Murakami's gas distribution components (Figure 6) is for providing for a uniform flow of process gasses over a wide area of substrates resulting in uniform films over wide areas of substrates as taught by Murakami (column 8; lines 18-46).

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (US 20040191413 A1)[1] and Murakami; Takeshi et al. (US 5,728,223 A) in view of Hayakawa; Yukihiro et al. (US 5,447,568 A). Park and Murakami are discussed above. Park and Murakami do not teach Murakami's reaction chamber (100; Figure 3) of claim 1, wherein a temperature sensor and a heater are mounted on Murakami's feeding block (piece above immediately 130; not labeled Figure 3) to control Murakami's temperature of Murakami's reactive gases (121, 122; Figure 3; page 8, lines 20-26), as claimed by claim 4.

Hayakawa teaches a wafer processing apparatus (Figure 10) including a gas distribution plate (3306; Figure 10,11) with a heater (3307; Figure 11) controlled by temperature sensors (4001; Figure 11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Hayakawa's heated and controlled (4000) gas distribution plate (3306; Figure 10,11) to the apparatus of Park and Murakami.

Motivation to add Hayakawa's heated and controlled gas distribution plate (3306; Figure 10,11) to the apparatus of Park and Murakami is for controlling the feed rate of gas as taught by Hayakawa (column 13; lines 43-48).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.